Recent Results and Plans for the Extended Science Mission for the Lunar Reconnaissance Orbiter Mission, J. W. Keller[1], R. R. Vondrak[1], T. P. McClanahan[1], J. B. Garvin[1], N. E. Petro[1], [1]Goddard Space Flight Center, Greenbelt MD 20771.

Introduction: The Lunar Reconnaissance Orbiter spacecraft (LRO), launched on June 18, 2009, began with the goal of seeking safe landing sites for future robotic missions or the return of humans to the Moon as part of NASA's Exploration Systems Mission Directorate (ESMD). In addition, LRO's objectives included the search for surface resources and the measurement of the lunar radiation environment. After spacecraft commissioning, the ESMD phase of the mission began on September 15, 2009 and was completed on September 15, 2010 when operational responsibility for LRO was transferred to NASA's Science Mission Directorate (SMD). The SMD mission was scheduled for 2 years and completed in September of 2012. Under SMD, the Science Mission focused on a new set of goals related to understanding the history of the Moon, its current state, and what it can tell us about the evolution of the Solar System.

Having recently marked the completion of the two-year Science Mission, we will review here the major results from the LRO for both exploration and science and discuss plans and objectives for the Extended Science that will last until September, 2014. Some results from the LRO mission are: the development of comprehensive high resolution maps and digital terrain models of the lunar surface; discoveries on the nature of hydrogen distribution, and by extension water, at the lunar poles; measurement of the daytime and nighttime temperature of the lunar surface including temperature down below 30 K in permanently shadowed regions (PSRs); direct measurement of Hg, H_2, and CO deposits in the Cabeus PSR; evidence for recent tectonic activity on the Moon; and high resolution maps of the illumination conditions at the poles.The objectives for the Extended Science Mission under SMD address four themes: 1) The nature of polar volatiles, 2) Lunar differentiation and early evolution, 3) The lunar impact record, 4) The Moon's interaction with its external environment.

The instruments, which were describe in detail previously[1], include ***Lunar Orbiter Laser Altimeter (LOLA)***, PI, David Smith, NASA Goddard Space Flight Center, Greenbelt, MD, ***Lunar Reconnaissance Orbiter Camera (LROC)***, PI, Mark Robinson, Arizona State University, Tempe, Arizona, ***Lunar Exploration Neutron Detector (LEND)***, PI, Igor Mitrofanov, Institute for Space Research, and Federal Space Agency, Moscow, ***Diviner Lunar Radiometer Experiment (DLRE),*** PI, David Paige, University of California, Los Angeles, ***Lyman-Alpha Mapping Project (LAMP)***, PI, Kurt Retherford, Southwest Research Institute, San Antonio, Texas, ***Cosmic Ray Telescope for the Effects of Radiation (CRaTER)***, PI, Harlan Spence, University of New Hampshire, New Hampshire, and ***Mini Radio-Frequency Technology Demonstration (Mini-RF)***, P.I. Ben Bussey, Applied Physics Laboratory, Maryland.

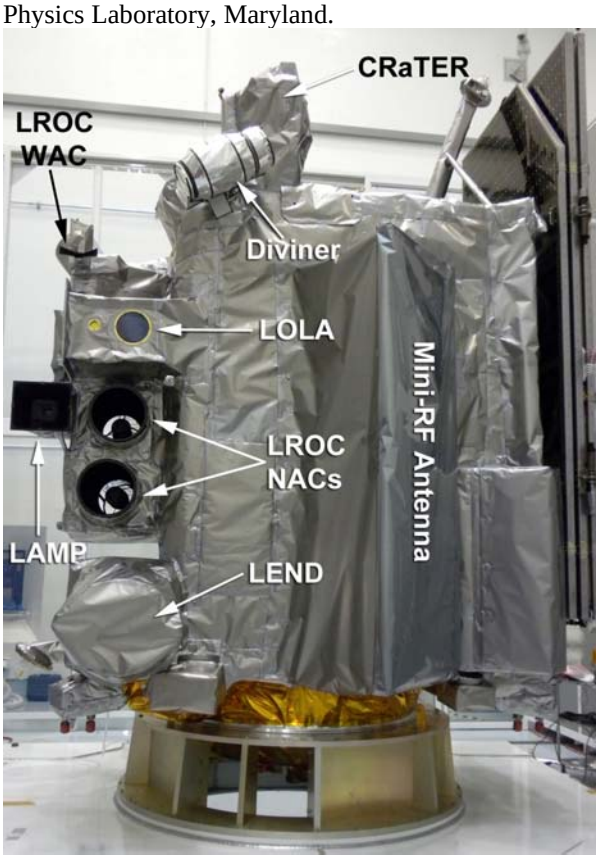

Figure 1 The fully assembled and thermal blanketed spacecraft.

Data Access: All of the LRO data are added to the Planetary Data System on three month intervals, with a latency of no more than 6 months. As of Dec. 15, 2012 more than 377 TBytes of data have been made available for science and exploration. The LRO team encourges outside use of these data.

References: [1] Vondrak, R.R., Keller, J.W., and Russell, C.T., (Ed.s), 2010, Lunar Reconnaissance Orbiter Mission, New York, Springer.